

**DATA EVALUATION RECORD
BEE HEALTH MONITORING IN SWITZERLAND
(NON-GUIDELINE STUDY)**

1.) CHEMICAL: Clothianidin

PC Code No: 044309

2.) TEST MATERIAL : Poncho

Purity: Not reported

3.) CITATION:

Authors: Federal Department of Economic Affairs FDEA
Federal Offices of Agriculture FOAG
Pesticides Department
Switzerland

Title: Bee Health Monitoring in Switzerland

Study Completion Date: June 24, 2009

Laboratory: Swiss College of Agriculture

Sponsor: Swiss Agriculture Authorities, Switzerland

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4.) REVIEWED BY: Christina deMariano, Biologist
Environmental Fate and Effects Division, U.S. EPA

5.) STUDY PARAMETERS:

Test Species: Honeybees (*Apis mellifera*)

Test duration: ~62 Days

6.) CONCLUSIONS:

1. In both trials unnatural bee mortalities did not arise immediately after sowing and no Clothianidin residues were detected in the bees. The results confirm that under practical conditions with moderately flowering plants in the neighborhood of the sowing operation, the current regulations on the application of corn seeds dressed with clothianidin are adequate. However, adherence to the regulations should be strictly monitored in order to ensure protection of bees.
2. Increased bee mortality did not occur in either trial during the guttation period of the young corn plants. Clothianidin residues could not be detected in the bees or the honey. Harm to the health of bee colonies can be excluded on the conditions chosen for the trials.

7.) ADEQUACY OF THE STUDY:

A. Classification: Supplemental

B. Rationale: The document is considered background and is not subject to good laboratory practices standards. This study does not correspond to any data requirements.

C. Repairability: N/A

8.) GUIDELINES DEVIATIONS: This was a non-guideline test.**9.) SUBMISSION PURPOSE:** This study was conducted to evaluate the possible pesticide contamination of maize guttation fluid and honeybee contact with polluted guttation fluid. Also, monitor any adverse effects on honeybees from dust abrasion during seed dispersion.**10.) MATERIAL AND METHODS:**

A. Test Organisms: Honeybee (*Apis mellifera*)

B. Test Design

The trial was performed under field conditions in the INFORAMA Rütli agricultural college in Zollikofen. Two corn fields were grown, for which seeds dressed with the product Poncho (active substance clothianidin; amount applied: 25 g active substance/50,000 corn seeds) were used. The area of the corn crop in the first trial was 2 ha, with 36% of the area sown with seeds dressed with Poncho. The remaining area was sown with corn varieties dressed with the products Mesurol, Cruiser or Gaucho. In each instance, three bee colonies were set up 6 days before sowing in a fallow strip directly adjacent on two sides of the corn field in which the eight rows of corn bordering the strips were sown with seeds dressed with Poncho. These were bee colonies with about 20,000 bees per colony. The flight entrances of the hives were facing the corn field. Sowing occurred on 23.04.2009. The sowing machine (Nodet Pneumasem II) was fitted with a deflector (Zürcher Landtechnik GmbH Wikon) (Photo 1). The plants that were flowering in the neighbouring strips were dandelions and apple trees. The weather conditions were good. It did not rain on the day of sowing. The average wind speed varied around 2.6 m/sec, with peaks of 10.2 m/sec. The average temperature was 11°C (5.5-17°C). Bee colonies 48, 84 and 88 were located downwind during sowing and colonies 11, 33 and 56 were upwind. The area of corn in the second trial was 1 ha and was sown in strips with seeds dressed with Poncho. The seeds were sown directly in a mowed meadow sprayed with herbicide. The seeds were sown in rows tilled by the sowing machine. In this trial also, three bee colonies were set up in a meadow immediately adjacent on two sides of the corn field 16 days before sowing (Figure 1). These were heavily populated hives with about 12,000 bees per hive, with 4 honeycombs with broods. The flight entrances faced the corn field. Sowing occurred on 17.05.2009. The sowing machine (Kuhn/Nodet) was fitted with a deflector (Wyss Ittigen in-house design). The plants flowering in the neighbouring marginal strips were dandelion and clover. On the day of sowing it rained (19.9 mm), the average wind speed was 1.6 m/sec with peaks of 11.9 m/sec. The average temperature was 15°C (7.2- 22°C). The two fields were separated by about 200-300 m from each other.

11.) REPORTED RESULTS:

Three time windows were defined for evaluation of the data. The first time window covered the period before sowing and served as the reference value. The second time window covered the first three days after sowing and so included the potential acute effects of sowing on the bees. The data are intended to show whether the current regulations governing sowing of dressed corn seeds ensure an acceptable risk to bees. The third time window covered the period from week 1 to week 6 and so included the potential effects on bees due to guttation water on young corn plants.

Mortality:

In trial 1, the mean mortality rate was 3-12 bees/day. Immediately after sowing, the value in the period from day 1 to day 3 increased to 9-45 bees/day. During the subsequent between week 1 and week 6 the value was 17-21 bees/day. The differences between the colonies and over time were high and lay between 8 and 130%. In Trial 2 the mean mortality rate was 5-10 bees/day. Immediately after sowing, the value in the period from day 1 to day 3 varied from 7 to 20bees/day. During the subsequent between week 1 and week 6 the value was 10-20 bees/day. The differences between the colonies and over time were again high and lay between 40 and 120%.

12.) REVIEWER COMMENTS:

In the first trial, only 36% of the area was sown with seeds treated with Poncho. The other seed dressings used were Mesurol, Cruiser, or Gaucho; none of the other pesticides were tested in bees, pollen, honey, or guttation fluid. These aspects could have affected the outcome of the study.

Sampling protocol was inconsistent. Clothiandin residue was detected in dead bees sampled from eight of the twelve hives, but pollen was analyzed from the remaining 4 hives. Clothiandin was detected in pollen from hive eleven, but the hive/bees were not sampled. The type of mismatched sampling could lead to undefined pesticide exposure.

No interaction between honeybees and maize plants experiencing guttation was confirmed. Also, no lethal effects were monitored during exposure to guttation fluid. However, the results (high levels of clothianidin in guttation water) suggest that in the case of limited sources of water in the immediate vicinity, an increase risk to bees must be considered. In addition, no control hives were used.